

REMARKS/ARGUMENTS

Claims 1-14 are pending in the present application. Claims 1-8 and 10-14 have been amended to more clearly recite the subject matter of applicant's invention. Claim 9 is canceled without prejudice or disclaimer due to the amendments to claims 1 and 11 as discussed below. All of the claim amendments are completely supported by the application as filed and thus they raise no issue of new matter. Entry of the claim amendments into the file of the application is, therefore, respectfully solicited. Upon such entry, claims 1-8 and 10-14 will be pending in the application. Since all of the claims remaining in the application, as amended, are believed to be in condition for allowance for the reasons set forth herein, the Examiner is respectfully requested to reconsider and withdraw all of the objections and rejections set forth in the Office Action and to pass this case through to allowance.

Arrangement of the Specification

In response to the Examiner's comments concerning the arrangement of the specification on pp. 2-3 of the Office Action, applicant respectfully submits that relevant section headings, i.e., "Background of the Invention", "Summary of the Invention", "Brief Description of the Drawings" and "Detailed Description of the Invention" were introduced into the specification in the Preliminary Amendment filed with the present application. As amended, therefore, the specification is believed by applicant to be in compliance with the requirements of 37 C.F.R. 1.77(b).

Drawing Objection

As discussed on p. 3 of the Office Action, the drawings are objected to under 37 C.F.R. 1.83(a). According to the Office Action, the "innermost abutment point" against the corresponding end surface, as recited in claim 7, must be shown or the feature must be canceled from the claim. Applicant respectfully traverses the Examiner's objection.

The Examiner's attention is respectfully directed to drawing Figure 2 as submitted with the application. In the subject figure, the letter designation "a" designates the innermost abutment point as recited in claim 7. This feature is further described, with reference to Figure 2, at p. 8, line 6 of applicant's specification. It is, therefore, respectfully requested that the Examiner reconsider and withdraw his objection to the drawings filed with the application.

Claim Objections

Several objections to the claims are set forth on p. 4 of the Office Action. With regard to claim 11, line 4, wherein the Examiner suggests that “which” should be changed to “end”, applicant submits that believes it is more appropriate to change “which” to “said end”. The remainder of the changes proposed by the Examiner have, however, been implemented. The claims have thus been amended in a manner which is believed to overcome the grounds for objection. The Examiner is, therefore, respectfully requested to reconsider and withdraw his objections.

Claim Rejections Under 35 U.S.C. §112

Claims 10 and 14 are rejected under 35 U.S.C. §112 due to alleged indefiniteness for the reasons set forth on pp. 4-5 of the Office Action.

Claims 10 and 14 have, therefore, been amended in a manner which is believed to overcome the Examiner’s grounds for the rejection thereof. The Examiner is thus respectfully requested to reconsider and withdraw the rejections of claims 10 and 14 under §112.

Claim Rejections Under 35 U.S.C. §102

Claims 1-7 and 9-13 [*sic.*, 14] are rejected under 35 U.S.C. §102 (b) for anticipation over the ‘779 Patent for the reasons set forth on pps. 5-7 of the Office Action. This rejection is respectfully traversed.

In order to further clarify for the Examiner the distinctions between the presently claimed invention and the construct described in the ‘779 Patent, the definition of “concave” in independent claims 1 and 11 has been amended to recite that the first end surface, in an unstressed condition, is slightly concave in a radial direction, “such that it [the surface] is curved and limited by a curve being a concave function.” Support for this amendment is found at p. 4, lines 14-16 of the present specification. Additionally, the subject claims are further amended to incorporate therein the subject matter of claim 9 as originally filed. Claim 9 has thus been canceled without prejudice or disclaimer from the application.

In claims 1 and 11, i.e, both of the independent claims in this application, therefore, the end surface of the flanged end is described as being concave, with the additional clarification that the surface is limited by a curve being a concave function. Thus, the concave function can not encompass a straight line, i.e, it must be curved.

In contrast, however, neither the Buono '779 Patent, nor any of the other prior art documents made of record in this case disclose an end surface limited by a curved line. The '779 Patent, in fact, shows only surfaces which are limited by a combination of straight lines.

Furthermore, the '779 Patent also does not disclose an end surface, such as that recited in claims 1 and 11, which is inclined in the radial direction, outwards and away from a conceived opposite end surface of the second component. That part of the end surface in the Buono '779 Patent which is external to the bolt hole is inclined in an inward, not an outward, direction, towards the opposite end surface of the second component.

The first end surface, as taught in the specification and as described in, e.g., claims 1 and 11, must be construed to mean the entire end surface - that is, the end surface extending from one axial end to the other axial end. In the present case, this is from the innermost abutment point to the radially external end of the flange. Thus, the corresponding end surface in the '779 Patent is the surface identified as the "sealing surface 30", and which includes the marginal inner (36) and outer (38) portions which are flat, as well as a portion which is inclined inwardly. See, e.g., col. 2, line 70 to col. 3, line 8 of the subject '779 reference.

Consequently, for the reasons set forth above, the invention as recited in the independent claims 1 and 11 is submitted as being novel over the '779 Patent and the Examiner is thus respectfully requested to reconsider and withdraw his rejection of those claims.

Moreover, a number of the dependent claims in this application describe additional features of the present invention which are not taught by the '779 Patent.. As to these features, the discussion which follows is provided in response to the Examiner's treatment of applicant's dependent claims 2-7, 9-10 and 12-14 on pps. 5-7 of the Office Action.

Claim 2 is clearly distinguishable over the '779 Patent. The end surface as described in the patent has two flat radial portions (36, 38). See col. 3, lines 16-27 and col. 5, lines 17-19 wherein the reference states that the radially inner marginal portion . . . provides a flat sealing surface. Following this teaching, the same is then taught by the patent with regard to the radially outer portion. In contrast, claim 2 recites that the first end surface is concave over the entire extension thereof in the radial direction.

With regard to claim 3, applicant submits that there is no disclosure in the '779 Patent which could be construed as teaching the feature(s) recited in the subject claim.

The '779 Patent also does not disclose the subject matter contained in claim 4. That is, the radial marginal portions, as described by the reference, are flat, not concave.

The Examiner's remarks concerning claims 5/14 on p. 6 of the Office Action are believed to be incorrect. The '779 Patent discloses several inclined surfaces 30, 32, which, together, may be regarded as forming a concave surface. However, that definition of a concave surface does not correspond with the term 'concave' as now defined due to the amendments to claims 1 and 11. Moreover, the individual surfaces disclosed in the reference are not concave, they are straight. This is confirmed by their being defined as being frusto-conical in shape (see, e.g., col. 5, lines 22-28 of the reference). The explanation above similarly is relevant to the Examiner's comments concerning claim 6 on p. 6 of the Office Action

Turning to the Examiner's remarks concerning claim 7, applicant respectfully submits that he believes that the situation is not as described by the Examiner. That is, the innermost abutment point shown in the '779 Patent is located at the end of the flat inner marginal portion 36.

As to claim 9, applicant notes that the feature(s) recited therein has now been incorporated by amendment into independent claims 1 and 11 and that the subject claim has, therefore, been canceled without prejudice or disclaimer from the application.

Applicant further submits that the Examiner's comments concerning claim 10 are also believed to be unsubstantiated. That is, in the '779 Patent there is no part of a corresponding, "transition area" that is parallel to a longitudinal axis. Further, the reference contains no disclosure concerning an elliptical portion.

Regarding claim 12, applicant respectfully traverses the Examiner's remarks on p. 7 of the Office Action. In the '779 Patent the flanged member 12 does not have a concave end surface. It has a flat, radial outer face (16). See, e.g., col. 2, lines 48-50.

The Examiner is also incorrect with regard to claim 13. That is, the end surface of the member 12 disclosed in the '779 patent is not inclined.

Still further, applicant additionally traverses the Examiner's comments concerning claim 14 (see Office Action, p. 7). The '779 Patent does not disclose any surfaces which have a radius of curvature. That is, all parts of the end surface are flat or straight.

Thus, as demonstrated above, applicant's dependent claims recite several features of the present invention which are not found in the Buono '779 Patent.

Further to the above, moreover, claims 2-7, 10 and 14 depend from claim 1 and thus they include all of the recitations contained in the subject claim. Similarly, claims 12 and 13 depend from claim 11 and include all of the recitations of that claim. Thus, the subject dependent claims

are believed to further distinguish over the '779 Patent for the same reasons as claims 1 and 11, and the Examiner is, therefore, respectfully requested to reconsider and withdraw the §102(b) rejection based on the '779 Patent.

Claim Rejection Under §103

Claim 8 is rejected under 35 U.S.C. §103 over the '779 Patent for the reasons set forth on p. 7 of the Office Action. This rejection is respectfully traversed.

To begin with, claim 8 depends from claim 1 which, for the reasons above, is believed to be distinguishable over the subject reference.

Further to the above, in the '779 Patent the part external to the bolt hole (figure 2) is inclined in an inward direction, with an outermost part 38 being straight. Thus, the end surface as such is not inclined outwards and away from a conceived opposite end surface of a second component, as defined in claims 1 and 11. One problem posed by this shape in the cited reference is that, first, the innermost portion 36 will contact the opposing contact surface, and then the outermost portion will contact the corresponding opposing contact surface, before the in-between portions surrounding the neutral axis 34 do so. This will result in uneven deformation and may result in a situation wherein the area immediately surround the bolt hole does not contact the corresponding area of the opposite contact surface.

However, with the use of the present invention, a flange member is offered that provides a significantly improved sealing and a controlled deformation of the end surface/contact surface by contact/sealing first being established at the innermost edge of the end surface and then gradually being established in the outward direction as the bolts are tightened.

To modify the flange member disclosed in the '779 Patent in order to arrive at the present invention, as defined in the independent claims, the skilled person would have to change the straight lines of the frusto-conical areas forming part of the end surface into curved lines, and also modify the innermost and outermost flat surfaces into curved lines. In addition the end surface would have to be changed so as to be inclined outwardly, instead of part of it being inclined inwardly and portions of it being not inclined at all, as in the cited prior art. Such a modification would surely not be obvious.

The object of the present invention is to achieve very good sealing in flange joints, and in particular for metal-to-metal contact surfaces. In order to explain the importance of the new features defined in the independent claims 1 and 11, it should be mentioned that when testing

flanged joints including flanged members in accordance with the present invention, the measured leakage was in the order of 1 g He/500 years.

For purposes of comparison, reference is herein made to U.S. Patent No. 5,230,540 to Lewis et al., which is one of the prior art references made of record in this case. The subject patent was filed in 1990. In Column 12 of Lewis, lines 41-43, the expression "near-perfect sealing" is used, and to clarify the meaning of this it is indicated that the rates of hydraulic leakage are less than 0,01 liters/min. This may serve to illustrate what was considered as "near-perfect" sealing in the early 1990s.

The present invention achieves an enormous improvement in sealing, as indicated above. Consequently, the contribution of the new and inventive features are of such importance that a modification of any prior art as old as from the 1950's would seem extremely far-fetched. The '779 Patent was filed in 1957. In addition, the joint members in the subject patent have end surfaces that are adapted to be used with a very thick gasket (1/8 inch), which is very far from modern sealing technology as illustrated in the present application.

The Examiner is thus respectfully requested to reconsider and withdraw the 'obviousness' rejection under §103.

Prior Art

Applicant acknowledges the statement at p. 8 of the Office Action that the prior art made of record and not relied upon, including USP's 5,938,246 to Wallace et al.; 5,851,033 to Hunt et al.; 5,230,540 to Lewis et al. and 4,183,562 to Watkins et al., is considered pertinent to applicant's disclosure. Applicant submits, however, that none of the subject references are believed to teach or even suggest the presently claimed invention.

Further to the above, applicant notes that a copy of the International Search Report for applicant's corresponding PCT application was filed with the present application. Thus, the four (4) references cited therein should be made of record in this U.S. National Stage application. The Examiner has cited three of the references from the Search Report (or else, references which correspond to one or more of those cited) in the Form PTO-892 mailed with the Office Action regarding this case. However, applicant notes that the fourth reference on the International Search, ie., WO 93/17268, is not included by the Examiner. Attached to this Amendment, therefore, is a copy of WO 93/17268 as well as a PTO Form-1449 listing the subject reference. It is respectfully requested that this reference, as well, be made of record in the present application.

Summary

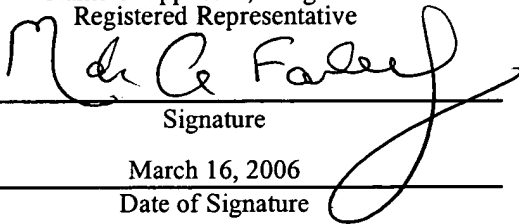
For the reasons above, applicant believes that all of the Examiner's grounds for objection and rejection have now been overcome. The Examiner is, therefore, respectfully requested to reconsider and withdraw his objections and rejections so as to permit this application to pass through to issuance.

If the Examiner believes that an interview would advance the progress of this application, he is respectfully invited to telephone applicant's representative at the number below so that such an interview can be arranged.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on: March 16, 2006

Mark A. Farley

Name of applicant, assignee or
Registered Representative

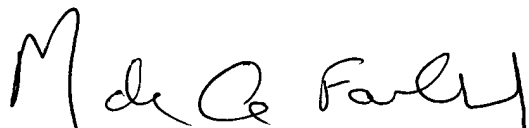


Signature

March 16, 2006

Date of Signature

Respectfully submitted,



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